consideration that a standard candle, seen at the distance of a mile, is only a little brighter than a first-magnitude star. Consequently, without taking atmospheric absorption into account, an incandescent body at a distance of 100 miles would only appear as a sixth-magnitude star if it shone with a light about equal to that of an electric lamp of 100 candles power. As only the larger meteors enter the earth's atmosphere to a depth of below 70 miles above the surface, it may be assumed that few of the meteors seen, except those which appear in the zenith, approach within 100 miles of the observer. One may, consequently, pretty safely assume that a meteor which is just visible to the naked eye is larger than the portion of the carbons which is rendered incandescent in an arc-light of 100 candles power. For a mass of carbon such as is used for electric lighting purposes gives off more light while being driven into vapour than other substances which have been experimented upon; and the carbon of the electric light is not exposed to the tremendous bombardment of cold air, which must tend greatly to accelerate the disintegration of the meteoric particles in their passage through the air, as well as to cool their surface by removing the incandescent matter as rapidly as it is formed. If the above reasoning is correct, a much greater amount of matter must enter the Earth's atmosphere during a meteoric shower than has hitherto been supposed. Such matter would in time find its way to the Earth's surface, and when we consider geological periods of time, would have a sensible effect on the growth of the Earth, and the shape of continents.

Note on an Erratic Meteor. By B. J. Hopkins.

In November 1885 I had the honour of reading before the Society a Paper, containing a series of observations of mine of a class of meteors which from the apparent form of their paths I termed "erratic." I pointed out in that Paper that the appearance of these bodies was comparatively rare, and in proof of that statement I may here remark that, in a correspondence on the subject which I had with Mr. Denning, he informed me that, though he had observed considerably over 1,300 meteors during the year 1885, only four of them described paths similar to those mentioned in my Paper above referred to.

On account of their being so rarely seen, I have thought that a few remarks upon one I had the good fortune to observe on December 4, 18 hrs., would not be without interest; particularly as the meteor presented not only the peculiarity of a wavy path, but also had that path broken in two. The meteor referred to was of a brilliant white colour, and equalled *Jupiter* in apparent magnitude; it made its appearance near *ν Ursa Majoris*, and disappeared between *ι Draconis* and *γ Ursa Minoris*.

The first portion of its flight extended from the point of its appearance to just beyond ζ *Ursa Majoris*, where it made a slight curve, the convex side of the curve being towards that star; at this point the train of light following the meteor in its flight divided, and the remainder of its path was continued at a short distance (about 30′) above the level—if I may use such a term—of the path pursued by it at its first appearance, though parallel to it. I have on one or two previous occasions noticed breaks in the path of a meteor, but never took any particular notice of it, looking upon it as merely an optical illusion; or the phenomenon has been so slight that I have not been able to decide whether I had actually seen it, or if it was due to fancy. Such an appearance as I have tried to describe would be caused, for instance, if at the point of disappearance of a meteor another made its appearance, and so as it were continued the path of the first. But in this case, owing to the brightness and slow motion of the meteor (it was visible for two seconds), and to the fact that I was looking at the part of the heavens in which it appeared at the moment it did so, thus having it in view from first to last, I can most confidently affirm that it was not an illusion due to the cause just mentioned, or to the imagination.

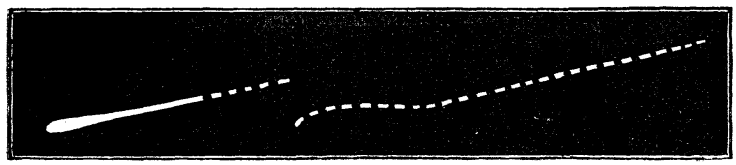

Diagram of Erratic and broken-pathed Meteor, 1886, Dec. 4.

A suggestion put forward, I believe, by Mr. Ranyard, during the discussion which followed the reading of my former Paper, viz., that the irregular shape of some meteors is the reason of their describing curved paths, will probably account for the slight curve I observed in the path of this meteor. But it is not so easy to explain the break in the path. Mr. Denning has observed meteors with divided paths, and accounts for them by ascribing the appearance as due to variations in the light of the meteor; this meteor did not, however, vary in brightness, and differed from those observed by Mr. Denning in that the second portion of its path was not in a line with the first. Whatever caused the meteor to change its course seems also to have been the cause of the momentary disappearance of the meteor, and it is in hopes of some explanation of the phenomenon being forthcoming that I venture to bring this observation before the notice of the Society.

Forest Gate, E.:
1886, *December* 9.

Ephemeris of the Satellites of Uranus, 1887. By A. Marth.

P, angle of position of the minor axes of the apparent orbits.

a, *b*, major and minor semi-axes of the apparent orbits.

$u - U$, longitudes of the satellites in their orbits, reckoned from the points which are in superior conjunction with the planet or in opposition to the Earth.

$U + 180°$, planetocentric longitude of the Earth reckoned in the assumed plane of the orbits from the ascending node on the celestial equator.

B, planetocentric latitude of the Earth above the plane of the orbits, the ascending node N and inclination T in reference to the equator of 1880·0 are assumed to have the values

$$N = 165°{\cdot}770 \qquad T = 75°{\cdot}210$$

The corresponding values in reference to the plane of the orbit of *Uranus* are: long. of node 166°·005, inclination 98°·017, the long. of the node being reckoned along the planet's orbit from the point which precedes the ascending node of the planet's orbit on the ecliptic by its ecliptical longitude.

Greenwich Noon.		*Ariel.*					*Umbriel.*			
		P	a_1	b_1	$u_1 - U$	Diff.	a_2	b_2	$u_2 - U$	Diff.
1887.		°	″	″	°	°	″	″	°	°
Jan.	13	284·388	14·62	+ 6·42	346·06	1428·49	20·31	+ 8·94	189·78	868·77
	23	·392	14·72	6·47	334·55	·46	20·50	9·02	338·55	·74
Feb.	2	·409	14·84	6·50	323·01	·43	20·68	9·06	127·29	·72
	12	·438	14·96	6·51	311·44	·40	20·84	9·07	276·01	·70
	22	·477	15·06	6·49	299·84	·37	20·98	9·04	64·71	·67
Mar.	4	·524	15·14	6·45	288·21	·35	21·10	8·98	213·38	·66
	14	·575	15·20	6·38	276·56	·32	21·18	8·89	2·04	·64
	24	·627	15·24	6·30	264·88	·29	21·23	8·77	150·68	·62
Apr.	3	284·679	15·24	+ 6·19	253·17	·27	21·24	+ 8·63	299·30	·61
	13	·729	15·22	6·08	241·44	·25	21·21	8·48	87·91	·61
	23	·774	15·18	5·97	229·69	·24	21·15	8·32	236·52	·59
May	3	·813	15·11	5·86	217·93	·23	21·05	8·16	25·11	·60
	13	·844	15·02	5·75	206·16	·22	20·93	8·01	173·71	·59
	23	·866	14·92	5·65	194·38	·22	20·78	7·87	322·30	·60
June	2	·880	14·80	5·57	182·60	·22	20·61	7·76	110·90	·60
	12	·885	14·67	5·50	170·82	1428·23	20·44	7·67	259·50	868·62
	22	284·881	14·54	+ 5·46	159·05		20·25	+ 7·60	48·12	